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CENTRAL FILES NUMBER  
48-10- 49

Date October 4, 1948

File \_\_\_\_\_

Subject: Second Weekly Progress Report  
on Oak Ridge National Laboratory Waste Disposal

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To C. N. Rucker

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From S. McLain

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To: C. N. Rucker

From: S. McLain

Subject: Second Weekly Progress Report on Oak Ridge National Laboratory  
Waste Disposal

This memorandum summarizes the work accomplished during the past week on the waste disposal work at the Laboratory. The first weekly report was dated September 27, 1948, Central Files, 48-9-254.

1. Solid Particles in Pile Cooling Air

Rapid progress has been made on the detailed design and construction of a filter building to remove particles from the pile cooling air. Attached is an isometric sketch of the building and a photograph of the construction taken on October 1, 1948. At present the design of the building is nearly complete with the exception of the ductwork and control devices. The forms for the side walls are about one-third completed and the installation of the reinforcing steel is about one-fourth completed. The construction of the entire building is about one-fourth completed. As shown by the isometric sketch, attached, the building has been designed to permit removal of the roughing filters by means of an overhead crane with disposal of the filters by dropping into a canal. Plans call for subsequent removal of the filter media under water, transfer to a coffin, and final burial. Before the filters are removed they will be sprayed with a coating material to hold all activity in place. The filters will be installed in banks with suitable ductwork and valves to permit removal or servicing while the pile is in operation.

Bids have been received on cyclone precipitators. The contract will be let within a very few days. Mr. A. L. Labbe, a specialist connected with the American Smelting and Refining Company, will aid our engineers in the conceptual drawings of an electrostatic precipitator during the coming week.

In last week's report it was incorrectly stated that a slug stuck in the pile on August 25th. The correct date was August 31st.

## 2. Pile Operation

On September 25th a swollen slug was detected in the pile. No increase in the activity of the exhaust air from the channel could be noted by the routine activity scanner. On discharge of the slugs from the channel one slug was found to have the aluminum cap pried loose from the can. Very little oxide escaped to the pile cooling system.

In order to determine the amounts of activity which are escaping up the pile stack a cyclone test unit was installed to measure the total amount of solid material and the activity under various pile operating conditions. The characteristics and source of the active particles will be determined. The unit was installed September 23rd and removes particles from 0.025% of the pile air. The particles collected range from several hundred microns to approximately ten microns diameter. Size distribution studies are being made. The data obtained are summarized in the table below.

<u>Period</u>	<u>Particles in Air Duot</u>			
	<u>Amounts, gms/hr</u>		<u>Activity, mc/hr</u>	
	<u>Min.</u>	<u>Max.</u>	<u>Min.</u>	<u>Max.</u>
30 hrs prior to removal of ruptured slug, 9-25	14	2.5	0.02	0.1
48 hrs after slug removal	1.5	3	1	2

It is believed that most of the increased activity after the slug failure was due to stirring up dust when the slugs were pushed and the fans restarted.

On October 1st a Chemical Warfare Service filter paper #6 was installed after the cyclone test unit. The filter had an area of 0.44 square feet. The filter picked up one microcurie of activity in the first test of five minutes. Almost all of this activity decayed in twenty-four hours. Incomplete data indicate the long-lived activity picked up by the full scale CWS filters per day will not be excessive.

The pile has been shut down most of the time since September 25th. For one week after the failure it was operated only when there was

a wind up the valley of over five miles per hour and when there was no inversion. The pile was started on October 2nd, on regular operating schedule. If further slug ruptures occur the pile may be down a large percentage of the time until the filter building is completed. This may result in cancellation of several isotope orders and probably result in failure to meet shipping dates on others.

The eleven slugs loaded into the pile in April, 1948 and maintained at 350°C were discharged to eliminate possible slug ruptures.

During the past week the inlet and exhaust ducts from the pile and fans were cleaned. The activity in the exit duct was decreased from approximately 1,200 mr per hour to about 300 mr per hour.

### 3. Area Decontamination

There are about 300,000 square yards of Laboratory area in various stages of vegetative coverage ranging from bare rock to heavily grassed areas. The bare soil and partially grassed areas will be covered with good topsoil and seeded this fall. The present grassy areas will be cut to decrease the danger of dusts blowing within the area.

About 120,000 square yards of streets, parking lots, road shoulders, and other areas subject to vehicular traffic will be paved by applying Armor-coat surfaces. Some roads will be closed and covered with soil and seeded.

### 4. Health Check

Chest films have been taken on most of the employees. These have not been read to date.

Initial steps have been taken to study 500 blood counts ranging from the middle of 1946 to the middle of 1948. This is a preliminary or scouting study only. The counts will be grouped into certain periods of time and compared between the separate years.

About 30 to 40 nasal swipes are being taken each night for determination of radioactive material. Results have not been obtained to date.

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5. Particles from Other Sources

Experimental and design studies have been started to determine the magnitude of the particle problem in respect to the circulating air and off-gas from the isotope and pilot plant areas. Several experimental cyclones and circulating pumps have been obtained. K-25 representatives are aiding in the design of an apparatus to measure the particles and activities which pass the Chemical Warfare Service #6 filters.

6. Slug Improvement

Experiments have been started in an attempt to determine the causes of slug ruptures. Holes 0.038 inches diameter were drilled through ten slugs. These slugs were heated at 250°C (482°F) with air at a velocity of 60 feet per second for 84 hours. No sign of swelling or failure occurred.

Studies to determine if enriched uranium oxide might be used in the pile have shown that this may be feasible. Further calculations on pile loading and discussions with representatives of K-25 and the Atomic Energy Commission will be held.

Representatives from Brookhaven National Laboratory visited the Laboratory to discuss the possibility of using the Brookhaven type of slug in the Oak Ridge pile. Design studies are being made to determine if these slugs could be charged and discharged from the pile.

*Stuart McLain*  
Stuart McLain

SMoL/mmd  
Attachments

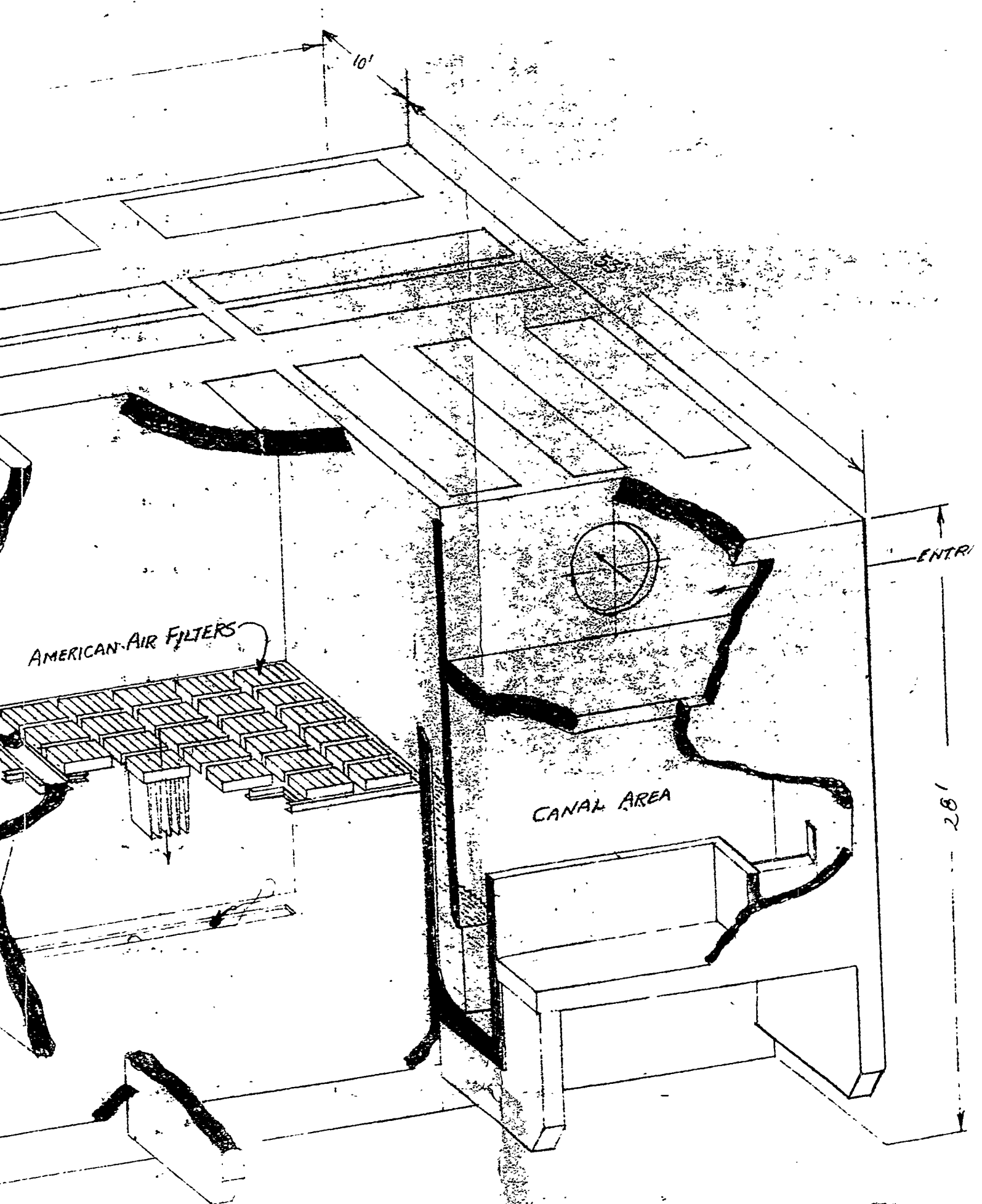
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CHEMICAL WARFARE  
FILTERS

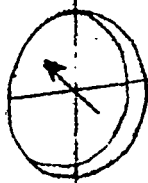


TRUCK LOADING  
AREA

DECONTAMINATION  
AREA



CHEMICAL WARFARE  
FILTERS



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DECONTAMINATION  
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NOTE OVERHEAD CRANE NO

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